Hollister-Whitney Elevator Corporation

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Hollister-Whitney Elevator Corporation

Installation and Service Manual
GL101, GL131, GL171, GL130A, GL185 and GL260
AC Permanent Magnet, Gearless Machines

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I. Introduction

Thank you for choosing a Hollister-Whitney, AC, Permanent Magnet, Gearless Machine!

The GL101, GL131, GL171, GL130A, GLl85 and GL260 machines have all been designed for use in machine room applications with VVVF controls. Machines are also designed with 28 or 40 poles to provide smoother, quieter, cooler and longer lasting operation.

"L" models are designed to run at lower voltages, but will require higher current supplies. Example: A GL171-20L, with 20" wheel, 2000# capacity, 200 fpm, requires 170V (208V supply) at 32 amps with 40% counter balance weight. Some machines run at speeds up to twice as fast as those listed in Tables 1 & 2 when supplied with 440 volts, all while maintaining the same current. For higher speed machines consult Hollister-Whitney Engineering. (The maximum BTU/Hour output of the machine will be double the value shown in Tables 1, 2 & 3.)

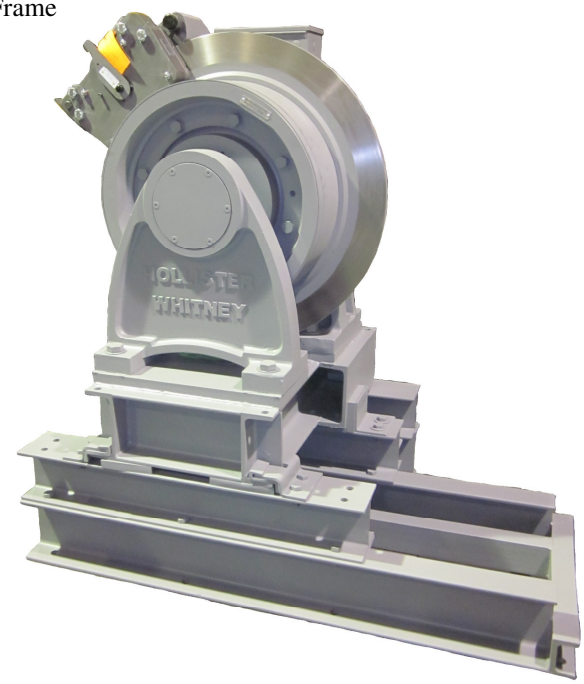
"H" models are designed to run at lower currents, but will require higher voltage supplies. Example: A GL171-20H, with 20" wheel, 2000# capacity, 200 fpm, requires 360V (440V supply) at 16 amps with 40% counter balance weight. These machines can also run at speeds down to half as fast as those listed in Tables 1 & 2 when supplied with 230 volts, all while maintaining the same current. (The maximum BTU/Hour output of the machine will be half the value shown in Tables 1, 2 & 3.)

Hollister-Whitney machines are designed to perform in a tolerant machine space. The machine space working temperature should be held between 50°F & 100°F, (10°C & 37.8°C) and humidity should be held to an average of 90% non-condensing.

II. Machine Specifications

Each Hollister-Whitney, GL series machine includes the following standard equipment:

- Sealed, maintenance-free bearings.
- De-mountable traction sheave with 105° Undercut "U" grooves standard, with other groove profiles available on request
- Main disc brakes, capable of holding 125% of the load. (Emergency brake available)
- Brake switches (wired normally open - standard.)
- En-dat Encoder & Cable (15 to 75 meter cable lengths available standard)
- Finishing Base Frame



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a. Duty Tables

All actual or running voltage is job specific and can be found on the Machine Data Tag.

Low voltage machines can achieve greater than charted car speeds – consult HW engineering

- Table 1 shows the maximum capacity for each machine, based on the following specifications:
  - **15" Traction Wheel** & 1:1 roping (50,45,& 40% counterbalance - Capacity in chart)

Model	Line Voltage (AC)	Current (Amps)	Capacity 50%-(lbs)	Capacity 45%-(lbs)	Capacity 40%-(lbs)	Car Speed (ft/min)	Machine RPM	Power H.P.	Torque Ft-lbs	Est. BTU/Hour
GL101-15L	208	26	1500	1350	1250	300	76.39	8.8	603	3279
GL101-15H	460	13	1500	1350	1250	300	76.39	8.8	603	3309
GL101-20L	208	34	1500	1350	1250	400	101.86	11.7	603	3606
GL101-20H	460	16	1500	1350	1250	400	101.86	11.7	603	3569
GL131-20L	208	44	2000	1800	1650	400	101.86	15.6	804	4118
GL131-20H	460	22	2000	1800	1650	400	101.86	15.6	804	4070
GL131-35L	208	81	2000	1800	1650	700	178.25	27.3	804	5148
GL131-35H	460	39	2000	1800	1650	700	178.25	27.3	804	5228
GL171-20L	208	32	3000	2800	2600	150	38.20	9.1	1254	6934
GL171-20H	460	16	3000	2800	2600	150	38.20	9.1	1254	6934
GL171-40L	208	65	3000	2800	2600	300	76.39	18.2	1254	6937
GL171-35L	208	99	2500	2250	2000	700	178.25	34.1	1005	5642
GL171-35H	460	56	2500	2250	2000	700	178.25	34.1	1005	5544

Table 1

- Table 2 shows the maximum capacity for each machine, based on the following specifications:
  - **20" Traction Wheel** & 1:1 roping (50,45,& 40% counterbalance - Capacity in chart)

Model	Line Voltage (AC)	Current (Amps)	Capacity 50%-(lbs)	Capacity 45%-(lbs)	Capacity 40%-(lbs)	Car Speed (ft/min)	Machine RPM	Power H.P.	Torque Ft-lbs	Est. BTU/hour
GL101-15L	208	26	1100	1000	900	400	76.39	8.8	603	3279
GL101-15H	460	13	1100	1000	900	400	76.39	8.8	603	3309
GL101-20L	208	34	1100	1000	900	500	101.86	11.7	603	3606
GL101-20H	460	16	1100	1000	900	500	101.86	11.7	603	3569
GL131-20L	208	44	1500	1350	1250	500	101.86	15.6	804	4118
GL131-20H	460	22	1500	1350	1250	500	101.86	15.6	804	4070
GL131-35L	208	81	1500	1350	1250	900	178.25	27.3	804	5148
GL131-35H	460	39	1500	1350	1250	900	178.25	27.3	804	5228
GL171-20L	208	32	2250	2125	2000	200	38.20	9.1	1254	6934
GL171-20H	460	16	2250	2125	2000	200	38.20	9.1	1254	6934
GL130A1-20L	208	40	2800	2650	2500	200	38.20	11.4	1568	8671
GL130A1-20H	460	20	2800	2650	2500	200	38.20	11.4	1568	8671
GL171-40L	208	65	2250	2125	2000	400	76.39	18.2	1254	6937
GL130A-40L	208	85	2800	2650	2500	400	76.39	22.8	1568	7917
GL171-35L	208	99	1875	1700	1525	900	178.25	34.1	1005	5642
GL171-35H	460	56	1875	1700	1525	900	178.25	34.1	1005	5642

Table 2

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- Table 3 shows the maximum capacity for each machine, based on the following specifications:
  - **25" Traction Wheel** & 1:1 roping (50,45,& 40% counterbalance - Capacity in chart)

Model	Line Voltage (AC)	Current (Amps)	Capacity 50%-(lbs)	Capacity 45%-(lbs)	Capacity 40%-(lbs)	Car Speed (ft/min)	Machine RPM	Power H.P.	Torque Ft-lbs	Est. BTU/hour
GL130A-20L	208	40	2250	2125	2000	250	38.20	11.4	1568	8671
GL130A-20H	460	20	2250	2125	2000	250	38.20	11.4	1568	8671
GL185-35L	208	78	3400	3150	3000	350	53.48	24.0	2357	6789
GL185-35H	460	38	3400	3150	3000	350	53.48	24.0	2357	6789
GL260-35L	208	115	4500	4250	4000	350	53.48	32.0	3138	9038
GL260-35H	460	55	4500	4250	4000	350	53.48	32.0	3138	9038
GL130A-40L	208	85	2250	2125	2000	500	76.39	22.8	1568	7917
GL185-50L	208	105	3400	3150	3000	500	76.39	34.3	2357	9698
GL185-50H	460	50	3400	3150	3000	500	76.39	34.3	2357	9698
GL260-50L	208	150	4500	4250	4000	500	76.39	45.7	3138	12911
GL260-50H	460	76	4500	4250	4000	500	76.39	45.7	3138	12911
GL185-70L	208	148	3400	3150	3000	700	106.95	48.0	2357	13577
GL260-70L	208	225	4500	4250	4000	700	106.95	63.9	3138	18076

Table 3

b. Maximum System Loads

- The maximum system loads shown in Table 4 are based on 50% counterbalance and 1:1 roping.
- The overall system load is calculated by adding together the following items:
  - Total empty car weight + Total counterweight + Capacity + Total hoist rope weight + Total compensation weight + Total traveling cable weight
  - Consult HW engineering for specific Machine/Speed/Capacity combinations in highlighted boxes
  - Some Speed & Capacity combinations not yet available

Car Speed (fpm)	Shaded boxes Represent different Sizes of Motor Windings per Machine Size									
	15" T.W.			20" T.W.				25" T.W.		
	GL101	GL131	GL171	GL101	GL131	GL171	GL130A	GL130A	GL185	GL260
50	23000	24800	25700	23000	24800	25700	24750	24750	23900	26700
100	23000	24800	25700	23000	24800	25700	24750	24750	23900	26700
150	23000	24800	25700	23000	24800	25700	24750	24750	23900	26700
200	23000	24800	25700	23000	24800	25700	24750	24750	23900	26700
250	23000	24800	25700	23000	24800	25700	24750	24750	23900	26700
300	23000	24800	25700	23000	24800	25700	24750	24750	23900	26700
350	23000	24800	25700	23000	24800	25700	24750	24750	23900	26700
400	23000	24800	25700	23000	24800	25700	24750	24750	23700	26700
450	22350	24800	25700	23000	24800	25700	24750	24750	22900	26700
500	21650	24800	25600	23000	24800	25700	24750	24750	22200	26700
550	21000	24800	24900	22900	24800	25700	24750	24750	21500	26700
600	20500	24250	24200	22300	24800	25700	24750	24750	21000	26700
650	20000	23650	23600	21800	24800	25700	24750	24750	20500	26700
700	19550	23150	23100	21300	24800	25200	24750	24750	20000	26700

Table 4

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c. Brake Specifications

- 115 VDC model brake is supplied standard from the factory. Refer to Table 5.
- Brake Switch: Rating 250 VAC, 3A; Recommended Switching Current 24VDC, 10 to 50 mA; (Minimum 12VDC, 10mA)
- Switches can be wired: Normal Open, - Black & Blue wires - as shipped
  Normal Closed - Black & Gray wires

Brake Model:	**Mayr 6 GL101 & GL171**	**Mayr 8 GL131**	**Mayr 10 GL130A, GL185, & GL260**
Pick Voltage (VDC):	104@1.7A	104@2.27A	104@3.6
Pick Power (W):	155	236	375
Hold Voltage (VDC):	52@.86A	52@1.14A	52@1.8
Hold Power (W):	39	59	94
Resistance (ohms)	69.8	45.8	28.8

Table 5

- The machine brakes may be mounted in up to 5 locations around the body of the machine to provide flexibility in machine placement and proximity to other equipment or walls. Refer to Figure 1 for the standard and optional brake mounting locations.

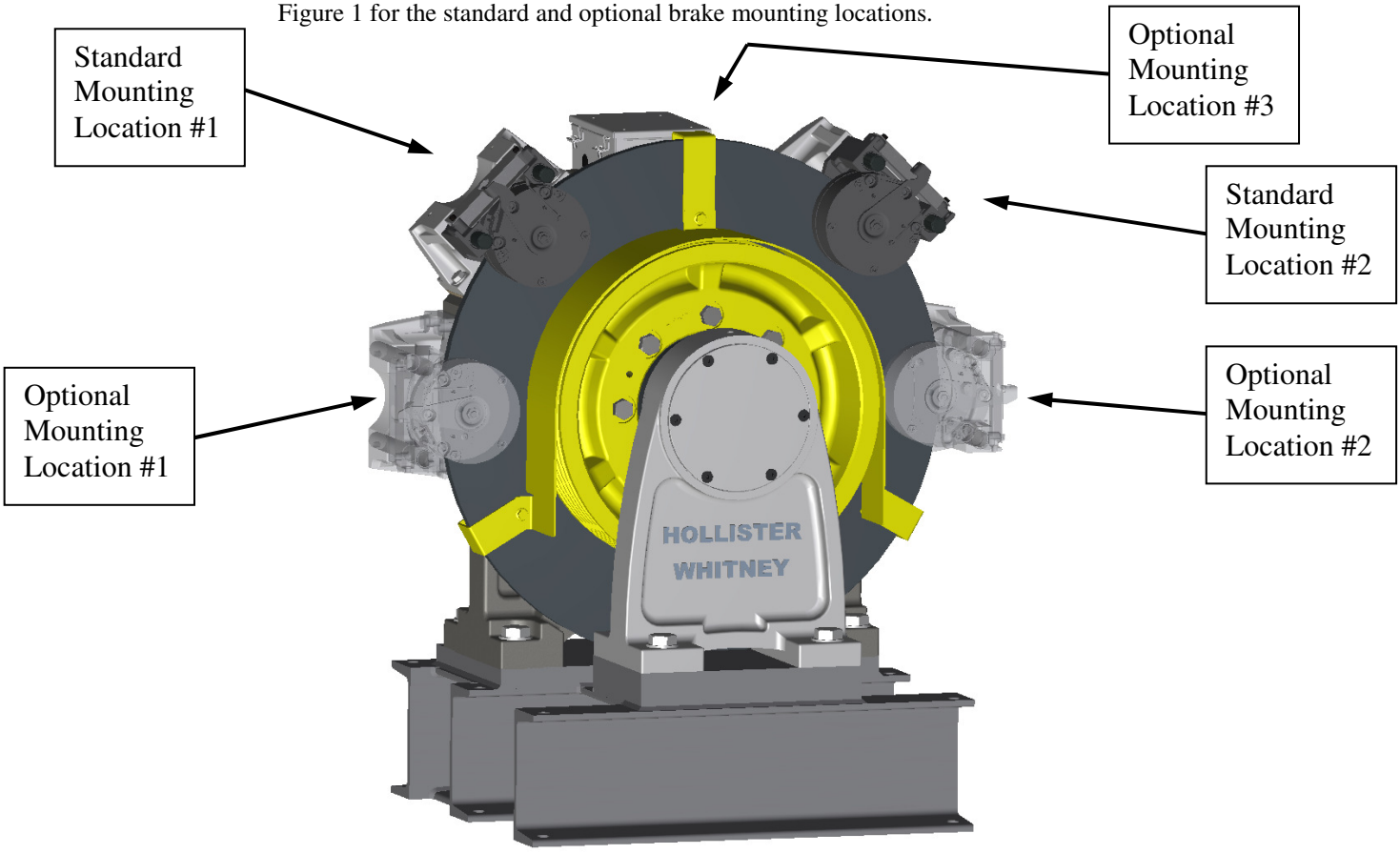

Figure 1 (4 brakes shown as representation only)

- **Top mount - Optional mounting location #3** – Only available on some machines – Consult Hollister-Whitney Engineering.
- If brakes are to be mounted using either of the optional mounting locations shown in Figure 1, mounting positions should be requested at the time of ordering. Brakes may be relocated in the field when necessary. Contact Hollister-Whitney for instructions.

d. Machine Properties, Dimensions and Parts Lists

- See attachments in Section VIII "Support Documentation" at back of manual for machine dimensions and parts lists:
  - GL101 Dimensions & Parts List
  - GL131 Dimensions & Parts List
  - GL171 Dimensions & Parts List
  - GL130A Dimensions & Parts List
  - GL185 Dimensions & Parts List
  - GL260 Dimensions & Parts List

III. Receipt, Handling, Storage and Commissioning

a. Receipt

- Upon delivery of the machine, inspect the machine for damage. If any damage due to transportation is noted, contact the carrier and Hollister-Whitney.
- Check the machine data tag to ensure the machine conforms to your order. (An example data tag is shown in Figure 2.)

Figure 2

b. Handling

- The machine will be delivered on wooden boards. The machine may be left on boards and moved with standard fork truck or pallet jack equipment.

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- When the machine is removed from boards, it must be moved by hoisting through holes provided in machine base. Figure 3
- When hoisting the machine, mount and use hoisting rigging so that it does not rest against the machine. This will reduce the damage that might be cause during movement and installation.
- Use Table 6 to determine your specific machine weight. Weights are approx., since other options might be added by customer, (extra brakes, rope gripper, etc.)

Machine Weight		
Model	**Weight**	**Weight**
GL101	2000 lbs.	910 kg
GL131	2300 lbs.	1040 kg
GL171	2400 lbs.	1100 kg
GL130A	3900 lbs.	1770 kg
GL185	4300 lbs.	1950 kg
GL260	4800 lbs.	2200 kg

Table 6

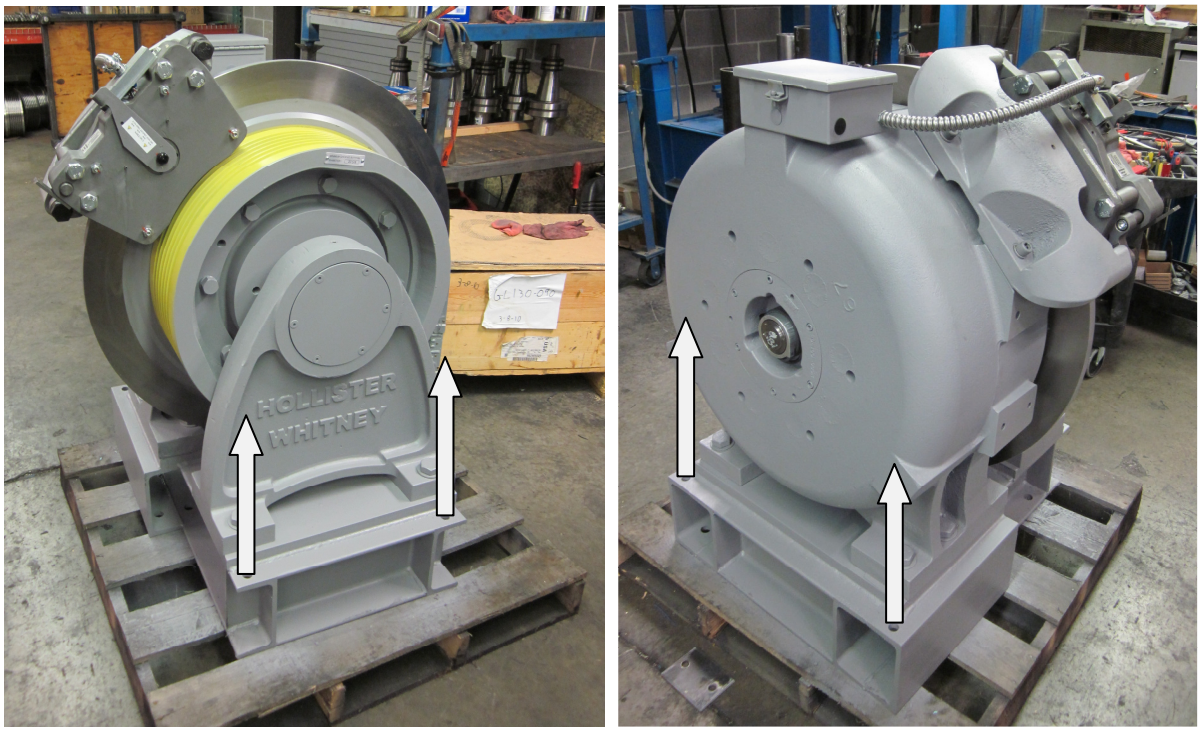

Figure 3

DO NOT USE ANY OTHER MACHINE COMPONENT TO LIFT THE MACHINE! USE ONLY THE MACHINE BASE WHEN LIFTING AND MOVING THE MACHINE! HOISTING THE MACHINE BY ANY OTHER COMPONENT WILL RESULT IN DAMAGE TO THE MACHINE AND POSSIBLE FAILURE RESULTING IN THE MACHINE FALLING FROM THE HOISTING SYSTEM!

- Follow all the necessary safety precautions to avoid damage to the machine or risk to personnel when moving the machine.

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c. Disassembly / Reassembly (Disassembly of Machine is not recommended!)
Disassembly of Machine VOIDS Warranty

If disassembly must be done to get machine to final position please follow procedure below

- **Step 1: Remove End Caps**
  - Use a hex wrench, loosen and remove (6) Outboard Stand End Cap bolts. (See Figure 4) Remove End Cap, slide Bearing End Cap against Traction Sheave
- **Step 2: Remove Outboard Stand**
  - Mark front side of Outboard Stand. Loosen and remove Outboard Stand mounting bolts.(See Figure 5)

Figure 4

Figure 5

  - Slide Outboard Stand off Base Fabrication. ***Do not force or put Outboard Stand in a bind, as this will cause damage to the Outboard Stand Bearing.*** **NOTE:** if shims are present under Outboard Stand, note their location and quantity. These shims will have to be placed in same location, to correctly align Outboards Stand to Motor upon reassembly.
- **Step 3: Remove Motor from Base Fabrication**
  - Loosen and remove bolts holding Motor Housing to Base Fabrication.
  - Remove plugs from top of Motor Housing, insert Hoisting Eye Bolts, lift Motor using eye bolts and pull straight up with spreader, or other rigging apparatus. (See Figure 6) ***Use eye bolts to lift only motor, not complete machine assembly***
  - If shims are present, note there location and quantity.

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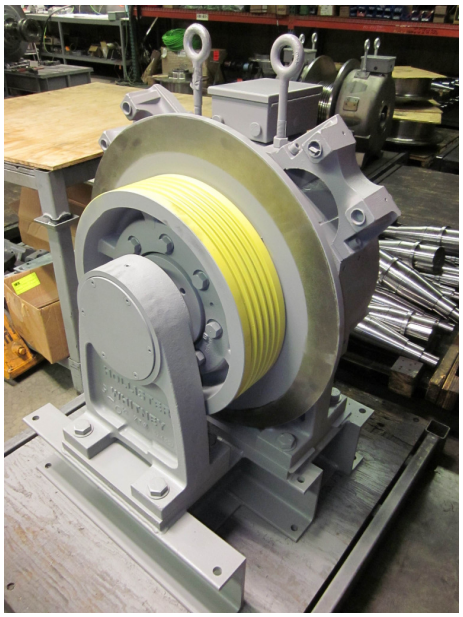

Figure 6 – GL171 with 2 lifting eye bolts installed

Figure 7

- **Step 4: Install Machine**
  - Follow guidelines below in section **IV. Installation**
- **Step 5: Reassemble Machine on Base Fabrication**
  - Hoist Motor onto Base Fabrication. Remember to install shims where they were located in **Step 3.** Tighten bolts through Fabricated Base.
  - Hoist Outboard Stand onto Base Fabrication. Remember to install shims where they were located in **Step 2.** ***When installing Outboard Stand use extreme care when sliding Stand over Bearing so that you don't bind the Outboard Stand Bearing in any way***.
- **Step 6: Check alignment of Outboard Stand to Motor**
  - Use a Dial Indicator mounted on a Magnetic Base. Set Magnetic Base on Motor Shaft and rest Indicator against Outboard Stand Bolting rim. Check Outboard Stand is in Alignment with Motor by turning motor by hand. Adjust Outboard stand as necessary and double check final alignment prior to removing indicator. (See Figure 7)
  - Tighten Outboard Stand Bolts.
- **Step 7: Install Caps:**
  - Slide Bearing End Cap against back of Outboard Stand. Install Front Bearing End Cap on Front of Outboard Stand. Bolt 2 End Caps together.

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d. Storage

i. **Short-Term Storage**

- For short-term storage, place the machine in a warm, dry and clean environment.
- Protect the machine from harsh weather conditions and temperature variations that can lead to condensation.
- Protect the machine from dust, dirt and metal shavings. Metal dust and shavings can be attracted into the machine by the magnets.

ii. **Long-Term Storage**

- For long-term storage, place the machine in a sealed, waterproof enclosure with a dehydrating packet that is sized for the enclosure volume and humidity level.
- Follow the same instructions as outlined in Section III.d.i - "Short-term storage."

e. Commissioning

- Before the machine is installed, and before any voltage is applied, check the machine for condensation or any evidence of condensation or water. If any evidence of wetness is found, contact Hollister-Whitney for drying instructions.
- If wetness has been found and the machine has been dried, it will be necessary to re-verify the insulation between each coil phase and earth ground.
  - Using an insulation tester (or megohm-meter), check the insulation resistance at 500 VDC. The resistance should be ***NO LESS*** than 100 Mohm.
- If the machine has gotten wet during transportation, contact the carrier and Hollister-Whitney.

IV. Installation

a. Machine Mounting

- Before hoisting the machine into place, verify all the hoisting equipment is rated for the weight of the machine. Refer to Table 6.
- Refer to Section III.b - "Handling" for the proper hoisting and handling procedures.
- Provide a level, structural support rated for the load on the machine.
- Ensure there is proper clearance around the machine for maintenance and adjustments.
- The machine may be mounted in traditional overhead and machine-room-less applications with down-pull on the traction sheave, or in basement set application with up-pull on the traction sheave. Special Machine Base fabrications are available for basement set applications.

i. Traditional Overhead

- Anchor the machine base to the structural support using the mounting hole locations in the base.
- The bolts and washers required to anchor the machine base to the support, when not provided, should be Grade 5 minimum (Bolts adhering to ASTM A325 are also suitable), and of sufficient size and quantity to secure the machine from movement, with consideration for adherence to all applicable building codes and ASME A17.1.

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- Hollister-Whitney does not typically include the machine mounting hardware with the machine due to variations in structural machine support.

ii. Basement Set Mounting

- Basement Set Machines are available, machine base fabrications and mounting plates specially designed for up-pull applications.
- Mounting plates are available for New Pour applications, and for adapting to Existing Structures.
- Refer to all applicable building codes and ASME A17.1 when selecting hardware (or other anchoring systems) to anchor the machine mounting plates to the structural supports in an up-pull application.
- Use the more stringent criteria between the building codes, ASME A17.1 and the minimum bolt grades identified in Section IV.a.i.

b. Electrical Connections

i. Machine Wiring

BEFORE PERFORMING ANY ELECTRICAL CONNECTIONS, MAKE SURE THAT POWER SUPPLY IS TURNED OFF. ONLY THEN PROCEED WITH CONNECTING ELECTRICAL LEEDS TO POWER SUPPLY. NEVER WORK IN MACHINES ELECTRICAL ENCLOSURE WHILE POWER SUPPLY IS ON!!!

- Thermal Protection Switch (TPS) is wired with leads labeled and supplied into the machine electrical enclosure. Refer to Figure 8. Contacts are Normally Closed, opening if an overheat condition exists, and will close again after the machine has cooled to safe operating temperatures.
- Consult your controller manufacturer for appropriate TPS connections.
- Verify the electrical supply from the elevator drive and brake power supplies match the machine data tag. Refer to Figures 2.
- Connect the U-V-W lines from the drive as they correspond to motor. See Figure 8.
- Earth Ground connects to the ground lug terminal inside the electrical enclosure.
- Connect the machine and emergency brakes where shown in Figure 8.
- The brake switches are wired Normally Open from Hollister-Whitney. To change the switches to function as normally closed, remove the blue wire from the terminal block in the electrical enclosure, and replace it with the spare gray wire coming from the brake switch.
- **NOTE –** The GL171 machine brakes are to be wired together to function as a single machine brake with the rope gripper (or second set of brakes) acting as the emergency brake.
- **Kits are available for field relocation of the electrical enclosure.** The electrical enclosure location can also be relocated at the factory at the time of machine assembly.

THE MACHINE AND EMERGENCY BRAKE COILS MUST BE INDEPENDENT!

IT IS THE RESPONSIBILITY OF THE USER TO CONNECT THE MOTOR IN ACCORDANCE WITH THE CURRENT LEGISLATION AND REGULATIONS IN THE COUNTRY OF USE. THIS IS PARTICULARLY IMPORTANT IN REGARDS TO WIRE SIZES USED TO CONNECT THE POWER AND EARTH GROUND AND THE TYPE AND SIZE OF FUSES.

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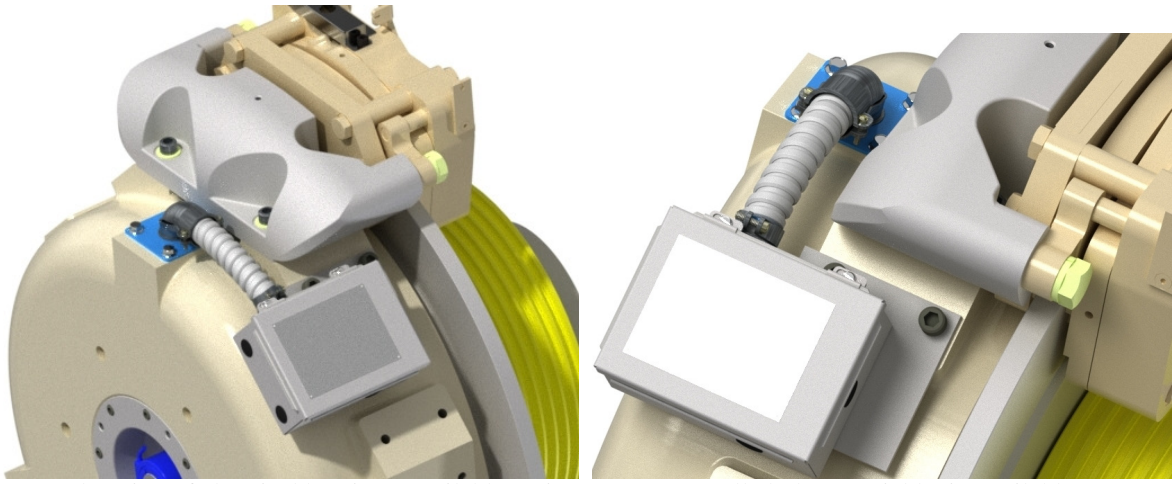

Relocation of electrical box is an available option: Factory Installed Shown, Field Kit Available.
Can be located at any open (see Figure 1) Brake Mounting position.

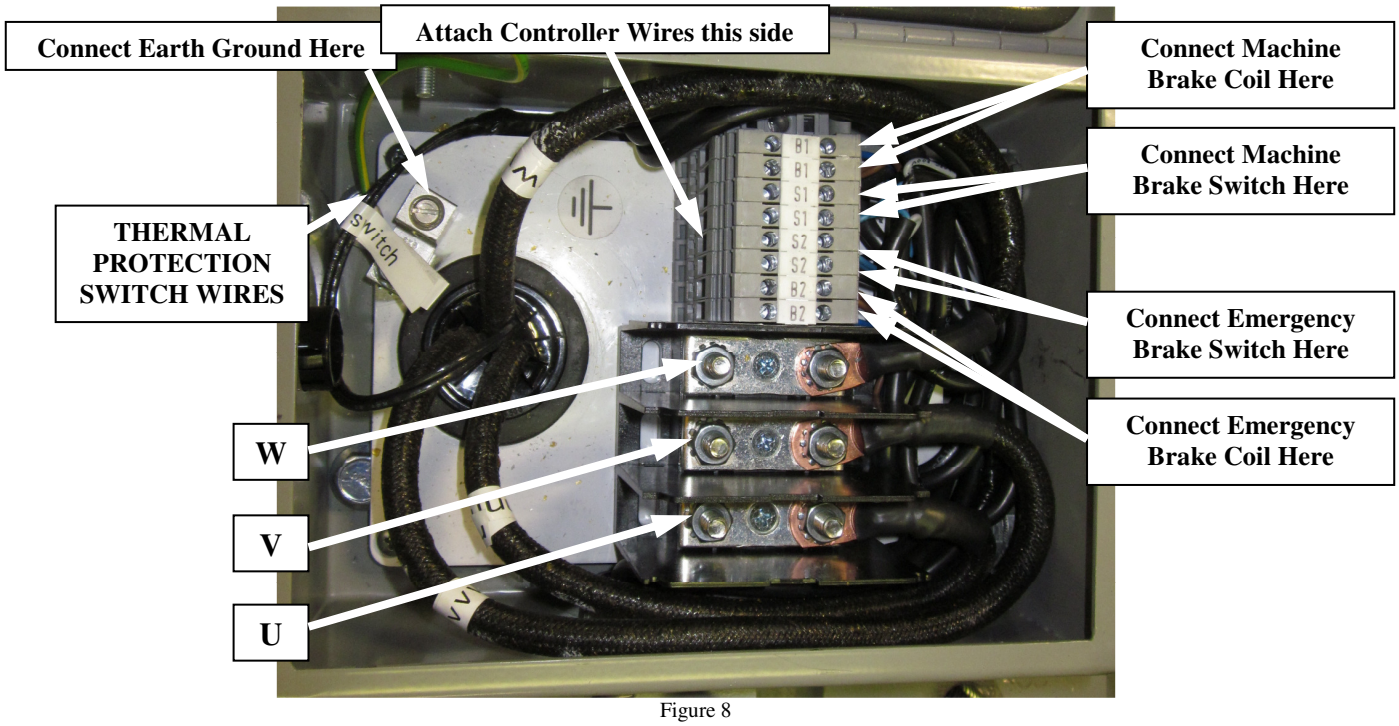

Figure 8

ii. Encoder wiring

- Connect the supplied encoder cable to the encoder on the back of the machine.
- When using a KEB drive, the encoder cable can be used "as-is."
- When using any other manufacturer's drive, consult control manufacturer for cable compatibility and availability. DO NOT modify the KEB cable without first consulting the control manufacturer. Any modification of the KEB cable voids the warranty.
- There are 2 cable classifications and each has its own color coding per cable. See attachments in Section VIII "Support Documentation" at end of manual for diagrams.
  - 30m and under – 00.F5.0C1-4005 document
  - 40m and over – 00.F5.0C1-L005 document

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c. Startup

- Verify all the motor related settings in the elevator controller match the information on the machine data tag. Refer to Figures 2.
- Verify that all the brake parameters match the information on the machine data tag. Refer to Figures 2.
- Remove any dirt, grease or rust that may have accumulated on the brake rotor during storage or installation. Use fine sandpaper or emery cloth with light pressure to remove rust from the rotor, taking care to keep the rust and metal dust out of the machine.
- Follow the controller manufacturer's procedure for alignment of the magnets.
- Briefly run the machine to verify the machine functionality and brake operation.
- Verify the drive sheave is plumb and aligned with the rope drop locations.
- Install the hoist ropes, adjust the rope shackles and check the ropes for equal tension. The rope tension must be uniform or it may cause vibration and premature wear on the traction sheave and hoist ropes.
- **Re-verify the traction sheave is plumb once the machine is fully loaded.**

d. Brake Burnishing

BRAKES MUST BE BURNISHED TO ACHIEVE FULL STOPPING TORQUE!

- Each brake on the machine must be burnished separately. Repeat the following procedure for each brake.
- Clamp the brake on the rotor. (De-energize the brake circuit.)
- Run the elevator in the direction of the load at 11 RPM for 1 minute
- If the overall travel of the elevator will not allow the burnishing time listed to be met on one pass, open (energize) the brake at the bottom of the hoist way, lift the load back to the top and repeat the run until the full burnishing time has been achieved.
- Stop occasionally to ensure the rotor and brake do not overheat.
- After burnishing, re-verify the air gap between the brake pads and the rotor. For brake check procedure and service follow Sections V.a. thru V.c. or VI.a. thru VI.c.
- Air gap should remain at approx. 0.020 inch

*** **NOTE:** **Air gap can surpass 0.020 inch, but must not exceed 0.040 inch.** ***

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e. Manual Brake Release (Optional Equipment)

- The manual brake release handle and cable is optional equipment that should be specified at the time of ordering. The standard cable length is 8'. Other lengths are available by special order.
- The brake release handle mounting plate may be mounted in any location that will be easily accessible to maintenance personnel.
- The manual brake release handle must be removed from the mounting plate prior to normal elevator operation.
- To remove the handle, loosen jam nut "A" on the handle and unscrew the handle from the brake release system.
- Figure 9 shows the manual brake release handle in place and Figure 10 shows the handle removed. (Brake handle mounting plate attached to back of machine for display only)

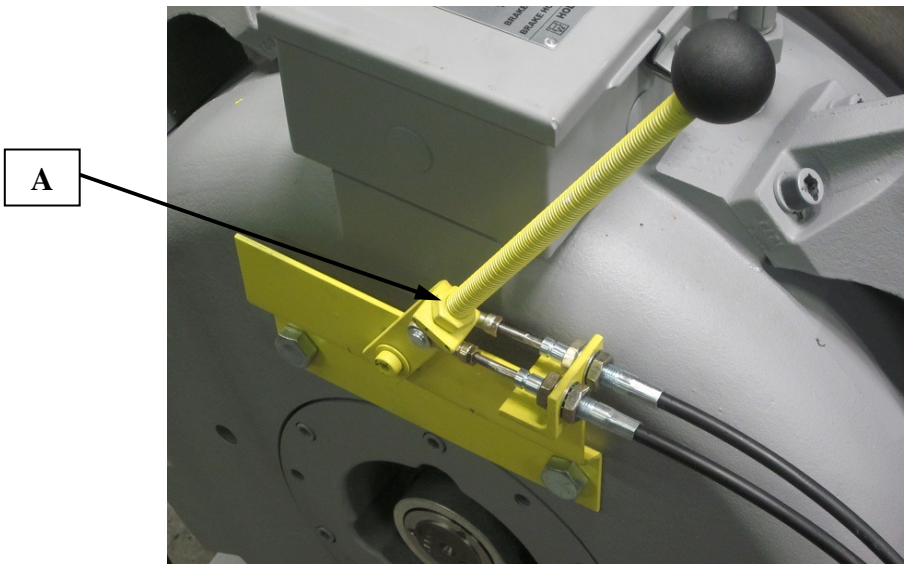

Figure 9

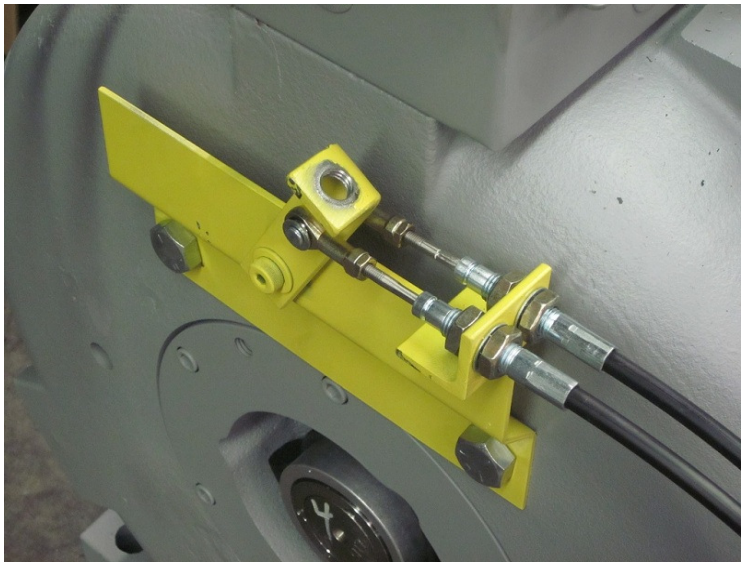

Figure 10